National Aeronautics and Space Administration

SPOTLIGHT

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Construction on SSC's A-2 Test Stand began in 1964. Excavation for the stand's foundation went down 50 feet, with steel pilings driven another 100 feet to form a framework for the massive amounts of steel rods and concrete that form the stand's base.

A flare stack at SSC's A-2 Test Stand burns off excess propellant after test-firing a space shuttle main engine.

Fueled by super-cold liquid hydrogen, and oxidized by liquid oxygen, the only byproduct of a space shuttle main engine test on the A-1 Test Stand is ultra-pure steam.

Cover Photo:
A recent space shuttle main engine test lights up the sky over SSC's A-2 Test Stand.

A-1, A-2 Test Stands

A-1 and A-2 are two of three rocket engine test stands built at NASA Stennis Space Center in the early 1960s to test the first and second stages of the Apollo Saturn V rocket that safely transported Americans to the moon. Construction on A-2 began in 1963, and on April 23, 1966, the first static firing of the Saturn V second-stage prototype engine (S-II-T) was conducted there.

That testing led to one of humankind's most phenomenal achievements when Apollo 11 Astronauts Neil Armstrong and Buzz Aldrin first set foot on the lunar surface July 20, 1969.

When the Apollo Program ended, A-1 and A-2 were converted from the Apollo/Saturn V configuration to accommodate testing of space shuttle main engines. On June 24, 1975, the A-1 stand had the first full-duration test-firing of an SSME. Less than a year later, A-2 followed suit with its first SSME test April 1, 1976.

Both A-1 and A-2 are supplied with cryogenic fluids, hydrogen and inert gases, industrial water and electrical power necessary for test operations. They are single-position, vertical-firing stands capable of static firing a test article up to 33 feet in diameter.

Liquid hydrogen and liquid oxygen are supplied to the stands from cryogenic transportation barges, and are fed to the test article from on-stand run tanks. Simultaneous resupply of the cryogenics from barge to run tank makes it possible to conduct extended-duration test operations.

The barges navigate between the test stands via a 7½-mile manmade canal system that connects the rocket engine test complex to the Pearl River, giving SSC access to the Gulf of Mexico. The canals are kept at a constant level by a lock system, spillway and replenishment pumps.

Gaseous hydrogen is provided as a pressurant for the liquid hydrogen run tank systems, and gaseous nitrogen is provided as a pressurant for the liquid oxygen systems. Both stands are operated from a common Test Control Center configured with separate systems, and both utilize the resources of the Data Acquisition Facility.

On Jan. 21, 2004, a milestone in human spaceflight was achieved when the 1 millionth second of successful test and flight operations of an SSME took place on the A-2 Test Stand. In 2006, SSC marked its 40th anniversary of testing SSMEs. A milestone for the A-1 Test Stand took place Aug. 17, 2006: the 1,000th SSME test conducted on that facility.

In October 2006, A-1 will begin undergoing modifications to convert from SSME testing to accommodate testing of NASA's Constellation Program's J-2X engine that will help return Americans to the moon.

Test Stand Statistics:

- Height: 274.9 feet
- Propellants: Liquid hydrogen, liquid oxygen
- Fuel supply vessels: Low-pressure run tanks, barges for resupply
- Maximum dynamic load: 1.1 million pounds of force
- Engines tested: Space Shuttle Main Engine, Linear Aerospike, Saturn V boosters
- Future engine: J-2X

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NASA John C. Stennis Space Center's A-1, A-2 Test Stands